

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION  
(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
 United States Patent and Trademark  
 Office  
 Box PCT  
 Washington, D.C.20231  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 07 April 2000 (07.04.00)
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International application No. PCT/EP99/05582	Applicant's or agent's file reference RFW/C70361
International filing date (day/month/year) 02 August 1999 (02.08.99)	Priority date (day/month/year) 05 August 1998 (05.08.98)

Applicant MULLER, Werner
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1. The designated Office is hereby notified of its election made:

in the demand filed with the International Preliminary Examining Authority on:  
22 February 2000 (22.02.00)

in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election  was  
 was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton  Telephone No.: (41-22) 338.83.38
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INT'L SEARCH REPORT

PATENT COOPERATION TREATY

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REC'D 17 AUG 2000

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16  
PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference  RFW/C70361	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No.  PCT/EP99/05582	International filing date (day/month/year)  02/08/1999	Priority date (day/month/year)  05/08/1998
International Patent Classification (IPC) or national classification and IPC  A46B15/00		
Applicant  SMITHKLINE BEECHAM GMBH & CO KG et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2

2. This REPORT consists of a total of ~~8~~ sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I     Basis of the report
- II     Priority
- III     Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV     Lack of unity of invention
- V     Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI     Certain documents cited
- VII     Certain defects in the international application
- VIII     Certain observations on the international application

Date of submission of the demand  22/02/2000	Date of completion of this report  14.08.00
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Spitzer, B  Telephone No. +49 89 2399 7501
	



INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

International application No. PCT/EP99/05582

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-22                   as originally filed

**Claims, No.:**

1-17                   as received on                   20/07/2000 with letter of                   17/07/2000

**Drawings, sheets:**

1/11-11/11           as originally filed

2. The amendments have resulted in the cancellation of:

- the description,       pages:  
 the claims,           Nos.:  
 the drawings,         sheets:

3.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

**see separate sheet**

4. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/EP99/05582

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes:	Claims 1-17
	No:	Claims
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-17
Industrial applicability (IA)	Yes:	Claims 1-17
	No:	Claims

2. Citations and explanations

**see separate sheet**

**VI. Certain documents cited**

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/EP99/05582

In addition to the first communication reference is made to the following documents:

- Doc4: WO 97 01298 A (PHILIPS) 16 January 1997 (1997-01-16) cited in the application
- Doc5: WO 92 06671 A (WIEDEMANN) 30 April 1992 (1992-04-30) cited in the application

Re Item I

**Basis of the report**

1. The amendments filed with the letter dated 17.7.2000 introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendment concerned is a part of claim 11: "and a layer of transparent head material is provided at this surface".  
The reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability has been carried out as if these features were not present.

Re Item VIII

**Certain observations on the international application**

3. Claim 1
  - 3.1 Claim 1 lacks clarity (Art. 6 PCT) because the wide use of "and/or" leads to a number of alternative solutions and among them only a few have a logical and physical sense; e.g.:
    - 3.1.1 How can the sheath be of a material which is transparent and at the same time a reflective material.
    - 3.1.2 How can radiation be transmitted from the core to the tooth and vice versa when the core is surrounded by a sheath which e.g. can be a reflective material and like in claim 4 e.g. a metal.
    - 3.1.3 Moreover, there is a contradiction in claim 1 between the features of the preamble and the features of the characterizing part. In the preamble the head is suitable to direct incident radiation **and** to collect emitted radiation whereas in the characterizing portion there are in one alternative means to direct **or** means to collect.
  - 3.2 Consequently it is not clear which is the matter for which protection is sought.

INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/EP99/05582

4. Claims 2 and 3 lack clarity (Art. 6 PCT) because they cannot depend on claim 1 which also includes the possibility that the sheath is made of a reflective material ("or"). In this case there is no transparent material in claim 1 and therefore, claims 2 and 3 which further specify the transparent material cannot depend on claim 1.
5. Claim 4 lacks clarity (Art. 6 PCT) because the dependency is wrong. Claim 4, which specifies the reflective material, cannot depend on claim 1, where in one alternative "or" the sheath is of transparent material but there is no reflective material.
6. Claim 5 lacks clarity (Art. 6 PCT) because it cannot depend on claim 1 as there is a contradiction between claim 1, where the toothbrush head comprises a core and a sheath, and claim 5, where the toothbrush head is made of a monolithic body. Moreover, in claim 5 the toothbrush head is transparent whereas in claim 1 the sheath comprises in one alternative a reflective material.
7. Claim 6 is unclear (Art. 6 PCT) because it is not clear where the optical fibres are located (in the sheath?, in the core?, the core comprises the optical fibers?). In addition, it is not clear, how they transmit the light to the tooth surface. In the description it is said, that the fibres may e.g. extend through the bristle surface (p. 4, l. 28) or may end in the transparent material below the surface of the head (p. 5, l. 1-2) and may face in the bristle direction (p. 5, l. 3).
8. Claims 8 and 11 lack clarity (Art. 6 PCT) because the term "substantially" is too vague and thereby renders the subject-matter of said claims unclear.
9. Claim 12 is unclear because it is not clear that the term "filaments" refers to "bristles" and not to "fibres". According to the requirements of Rule 10.2 PCT, the terminology and the signs shall be consistent throughout the application. This requirement is not met in view of the use of the expressions "filaments" and "bristles" for the same feature.
10. Inconsistency between description and claims
  - 10.1 Several embodiments of the invention do not fall within the scope of the claims; e.g. reflective coating may be covered with a non-transparent layer (p. 4, l. 16); head remote from the handle is angled (p. 15, l. 5) and coated with a reflective coating (p. 15, l. 7-8); etc.
  - 10.2 In addition, in the description several times the expression "additionally or alternatively" is used (p. 4, l. 9-10, l. 14-15; p. 5, l. 5-6; p. 11, l. 15 and 19; etc.). This expression lacks clarity because it is not clear in alternative to which

INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/EP99/05582

features.

- 10.3 This inconsistency between the claims and the description leads to doubt concerning the matter for which protection is sought, thereby rendering the claims unclear (Article 6 PCT).

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

11. Claim 1

- 11.1 The posed problem is how to find improved means for directing incident radiation onto the surface of the teeth and for collecting the emitted radiation.
- 11.2 In claim 1 of the present application according to one of the several alternatives - as far as it could be interpreted with the help of the description - this problem is solved by one or more cores made of transparent material which is/are surrounded by a sheath which is either made of transparent material with a higher refractive index than the core material.
- 11.3 Document Doc 4, which is considered to represent the most relevant state of the art, discloses a toothbrush with a toothbrush head (p. 6, l. 24-25) from which the subject-matter of claim 1 differs in that the material of the sheath is further specified.
- 11.4 The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) because all the essential features are already known from Doc4. A further specification of the sheath material is only a normal design option and does not contribute to the solution of the problem.
- 11.5 Thus, the subject-matter of claim 1 does not involve an inventive step and does not satisfy the criterion set forth in Article 33(3) PCT.
- 11.6 Moreover, the subject-matter of claim 1 differs from the disclosure of document Doc5 again only in that the sheath material is not specified.
12. Dependent claims 2 to 16 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, the reasons being as follows:
- 12.1 The additional feature of claim 2 is known from Doc3 (c. 2, l. 19-23).
- 12.2 The additional feature of claim 4 are a normal design option.
- 12.3 The additional features of claims 3 and 5 are known from Doc2 (c. 3, l. 8-9). The additional features of claim 5 are also known from Doc3 (c. 3, l. 26 and 30-31).

INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET

International application No. PCT/EP99/05582

- 12.4 The additional features of claim 6 are known from Doc4 (p. 3, l. 12-13).
- 12.5 The additional feature "core material is PMMA" of claim 7 is known from Doc4 (p. 7, l. 12) and the selection of the sheath material is a normal design option.
- 12.6 The additional features of claim 8 are known from Doc4 (Fig. 6) and Doc5 (Fig. 1).
- 12.7 The additional features of claims 9 and 10 are a normal design option.
- 12.8 The additional features of claim 11 are known from Doc4 (Fig. 6) and Doc5 (Fig. 1).
- 12.9 The additional features of claim 12 are known a normal design option.
- 12.10 The additional features of claim 13 are known from Doc5 (p. 8, l. 7-12).
- 12.11 The additional features of claim 14 are known from Doc5 (Fig. 1)
- 12.12 The additional features of claim 15 are known from Doc2 (c. 3, l. 30).
- 12.13 Claim 16 discloses a toothbrush with a toothbrush head according to claims 1 to 15.

As the toothbrush head is not inventive and as there are no other technical features, claim 16 is also not inventive.

13. Claim 17 refers to an injection moulding process for producing a toothbrush head according to the claims 1 to 16. Claim 17 does not disclose any new or inventive manufacturing steps with respect to that a person skilled in the art would normally use for producing said toothbrush head. Therefore, the subject-matter of claim 17 is considered not to fulfill the criterion set forth in Article 33(3) PCT.

**Re Item VI**

**Certain documents cited**

14. Document GB 9810471.4 is a document which was published between the priority date and the filing date of the present application. Therefore, the applicant's attention is drawn to the fact that it might be novelty-destroying in the regional phase.

**Re Item VII**

**Certain defects in the international application**

15. The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
16. The same reference number 176 is used for different features in Figure 17.
17. For GB 9810471.4 and for PCT/EP/03273 the referring publication numbers should be given.

**Claims:**

1. A toothbrush head having a bristle surface from which a cluster of bristles extends in a bristle direction, the head being suitable to direct incident radiation toward a surface of a tooth and to collect emitted radiation from the surface of the tooth, *characterised* in that the means to direct incident radiation toward the surface of a tooth, and/or the means to collect emitted radiation from the surface of the tooth comprise that the head is made at least in part of a material which is transparent to the incident and/or emitted radiation.
- 10 2. A toothbrush head according to claim 1 *characterised* in that the material which is transparent to the incident and/or emitted radiation is transparent over the wavelength range 400 – 630nm.
- 15 3. A toothbrush according to claim 1 or 2 *characterised* in that the transparent material is a transparent plastics materials.
4. A toothbrush head according to any preceding claim *characterised* in that the head of the toothbrush is made of a monolithic body of a material which is transparent to the incident and/or emitted radiation and may thus guide radiation transmitted internally within it.
- 20 5. A toothbrush head according to claim 4 *characterised* in that the material is coated, either wholly or partially, with a reflective coating.
- 25 6. A toothbrush head according to claim 4 or 5 *characterised* in that the head incorporates one or more optical fibres to direct incident and/or emitted radiation respectively to and from the tooth surface.
- 30 7. A toothbrush according to any one of claims 1 to 3 *characterised* in that the head of the toothbrush comprises one or more cores of a material which is transparent to the incident and/or emitted radiation, which guide radiation

transmitted internally within it, and having a refractive index  $N^1$ , the core being surrounded by a sheath which is also of material which is transparent to the incident and/or emitted radiation, the sheath having a refractive index  $N^2$ ,  $N^1$  being greater than  $N^2$ , such that internal reflection occurs as a result of the difference in refractive 5 index between  $N^1$  and  $N^2$  to direct radiation within the core.

8. A toothbrush head according to claim 7 *characterised* in that the core material is a polymethylmethacrylate and the sheath material polyethyleneterephthalate.

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9. A toothbrush head according to any one of claims 1 to 3 *characterised* in that the head of the toothbrush comprises one or more cores of a material which is transparent to the incident and/or emitted radiation which guide radiation transmitted internally within it, the core being surrounded by a sheath which is of 15 material which reflects the incident and/or emitted radiation, such that internal reflection occurs within the core so as to direct incident radiation passing in the longitudinal direction along the head into the bristle direction.

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10. A toothbrush head according to claim 9 *characterised* in that the reflective 20 material is a metal.

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11. A toothbrush head according to any one of claims 7 to 9 *characterised* in that the core is a generally "L" shaped structure having a limb oriented in the generally longitudinal direction of the head and a limb oriented generally in the bristle direction and terminating in a surface which is substantially perpendicular to the bristle direction.

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12. A toothbrush head according to claim 11 *characterised* in that the bend of the "L" between the limbs is curved or beveled to present a surface at 45° to the limbs.

13. A toothbrush head according to any one of the preceding claims *characterised* in that one or more thin radiation-guiding filaments made of a

material which is transparent to the incident and/or emitted radiation is used to guide radiation from the toothbrush head to the tooth surface and in the reverse direction.

5      14. A toothbrush head according to claim 13 characterised in that the filament(s) comprise(s) an inner core of a material transparent to the incident and/or emitted radiation enclosed within a sheath with the properties of the core and sheath being such that internal reflection occurs within the core to guide the radiation along the sheath.

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15. A toothbrush head according to claim 13 or 14 *characterised* in that the filament(s) is/are optically connected to a core which is within the toothbrush head.

15      16. A toothbrush head according to claim 15 characterised in that the core is of generally "L" shape and the filament(s) is/are fixed to or into a surface of the core which is substantially perpendicular to the bristle direction.

20      17. A toothbrush head according to any preceding claim characterised in that the bristle surface is provided with one or more bristle free areas which function as windows for radiation passing to and from the tooth surface to the toothbrush head.

25      18. A toothbrush head according to any preceding claim characterised by having one or more lenses for radiation passing to and from the tooth surface to the toothbrush head which focus emitted radiation from the toothbrush head onto the tooth surface and/or which focus or collect emitted radiation from the tooth surface.

19. A toothbrush having a head as claimed in any one of the preceding claims.

30      20. An injection moulding process by which a toothbrush head as claimed in any one of the preceding claims is made.

21. An injection moulding process by which a core for a toothbrush head, as claimed in any one of claims 7 to 12 is made.
22. An injection mould suitable for use in an injection moulding process as  
5 claimed in claim 21.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
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BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
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CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
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CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

## PATENT COOPERATION TREATY

PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>RFW/C70361</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/EP 99/ 05582</b>	International filing date (day/month/year) <b>02/08/1999</b>	(Earliest) Priority Date (day/month/year) <b>05/08/1998</b>
Applicant <b>SMITHKLINE BEECHAM GMBH &amp; CO KG et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :
  - contained in the international application in written form.
  - filed together with the international application in computer readable form.
  - furnished subsequently to this Authority in written form.
  - furnished subsequently to this Authority in computer readable form.
  - the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
  - the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.  Certain claims were found unsearchable (See Box I).

3.  Unity of invention is lacking (see Box II).

4. With regard to the **title**,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

17

None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/05582

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A46B15/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A46B A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 01298 A (PHILIPS) 16 January 1997 (1997-01-16) cited in the application page 4, line 33 -page 9, line 1; figures ---	1-4, 6, 19-22
Y	EP 0 593 375 A (LASER MEDICAL TECHNOLOGY INC) 20 April 1994 (1994-04-20) column 2, line 35 -column 5, line 8; figures ---	1-4, 6, 19-22
Y	WO 92 06671 A (WIEDEMANN) 30 April 1992 (1992-04-30) cited in the application page 8, line 1 -page 9, line 5; figures ---	1-6, 13-15, 17-22 -/-

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

12 November 1999

22/11/1999

Name and mailing address of the ISA

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Authorized officer

Triantaphillou, P

## INTERNATIONAL SEARCH REPORT

Interr national Application No  
PCT/EP 99/05582

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 297 05 934 U (KALTENBACH & VOIGT GMBH & CO) 5 June 1997 (1997-06-05) cited in the application page 7, line 11 -page 11, line 20; figures -----	1-6, 13-15, 17-22

## INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat'l Application No  
PCT/EP 99/05582

Patent document cited in search report	Publication date	Patent family member(s)		Publication dat	
WO 9701298 98 A		NONE			
EP 593375	A 20-04-1994	US	5306143 A	26-04-1994	
WO 9206671	A 30-04-1992	DE	4032779 A	23-04-1992	
DE 29705934	U 05-06-1997	IT	MI980564 A	05-10-1998	
		JP	10314194 A	02-12-1998	